Abstracts

A Multisection Broadband Impedance Transforming Branch-line Hybrid

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Measurements and design equations for a two-section impedance transforming hybrid suitable for MMIC applications and a new method of synthesis for multisection branch-line hybrids are reported. The synthesis method allows the response to be specified either of Butterworth or Chebyshev type. Both symmetric (with equal input and output impedances) and nonsymmetric (impedance transforming) designs are feasible. Starting from a given number of sections, type of response, and impedance transformation ratio and for a specified midband coupling, power division ratio, isolation or directivity ripple bandwidth, the set of constants needed for the evaluation of the reflection coefficient response is first calculated. The latter is used to define a driving point impedance of the circuit, synthesize it and obtain the branch line immittances with the use of the concept of double length unit elements (DLUE). The experimental results obtained with microstrip hybrids constructed to test the validity of the brute force optimization and the synthesized designs show very close agreement with the computed responses.

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